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LH HOPE INTEL CORP

PAGE 01

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Deliver to: Lanier, Benjamin E., USPTO Art Group: 2132Facsimile No.: (571) 273-8300 Date: February 1, 2006From: Libby H. Hope, Reg. No. 46,774Our Docket No.: 42447P11149 Number of pages 30; including this sheet.Application No.: 09/896,537 Filing Date: 6/30/2001Docket Due Date(s): 2/1/2006

Enclosed are the following documents:

<input type="checkbox"/> Amendment: _____ (_____ pgs)	<input type="checkbox"/> Issue Fee Transmittal
<input checked="" type="checkbox"/> Appeal Brief: <u>(26 pgs)</u>	<input type="checkbox"/> Notice of Appeal
<input type="checkbox"/> Application: _____ (_____ pgs) w/cover & abstract)	<input type="checkbox"/> Petition for: _____
<input type="checkbox"/> Assignment & Cover Sheet: (_____ pgs)	<input type="checkbox"/> Request for Continued Examination (RCE)
<input checked="" type="checkbox"/> Certificate of Facsimile: _____	<input type="checkbox"/> Reply Brief: (_____ pgs)
<input type="checkbox"/> Continued Prosecution Application (CPA)	<input type="checkbox"/> Request & Certification Under 35 USC 122(b)(2)(B)(i)
<input type="checkbox"/> Declaration & POA: (_____ pgs)	<input type="checkbox"/> Request to Rescind Previous Nonpublication Request
<input type="checkbox"/> Drawings: _____ sheets, _____ figures	<input type="checkbox"/> Response to Notice of Missing Parts & Formalities Letter
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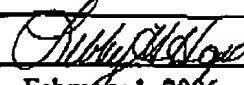
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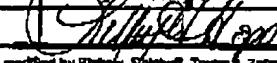
PAGE 02

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TRANSMITTAL FORM		Application No.	09/896,537
(to be used for all correspondence after initial filing)		Filing Date	June 30, 2001
		First Named Inventor	Gary Graunke
		Art Unit	2132
		Examiner Name	Lanier, Benjamin E.
Total Number of Pages in This Submission	29	Attorney Docket Number	4200P11149

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <ul style="list-style-type: none"> > <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Response <ul style="list-style-type: none"> <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <ul style="list-style-type: none"> <input type="checkbox"/> PTO/SB/08 <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <ul style="list-style-type: none"> <input type="checkbox"/> Basic Filing Fee <input type="checkbox"/> Declaration/POA <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation, Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): <div style="border: 1px solid black; padding: 5px; height: 40px; margin-top: 10px;">Certificate of Facsimile</div>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Remarks</div> <div style="border: 1px solid black; height: 40px; margin-bottom: 5px;"></div>		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Libby H. Hope, Reg. No. 46,774 INTEL CORPORATION
Signature	
Date	February 1, 2006

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Based on PTO/SB/21 (09-04) as modified by Blaney, Stollhoff, Taylor & Zerman (Rev. 11/03/2005).
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FEE TRANSMITTAL

• for FY 2005

Patent fees are subject to annual revision.

Applicant claims small entity status. See 37 CFR 1.27.

<i>Complete if Known</i>	
Application Number	09/896,537
Filing Date	June 30, 2001
First Named Inventor	Gary Graunke
Examiner Name	Lanier, Benjamin E.
Art Unit	2132
Attorney Docket No.	42000p11149

METHOD OF PAYMENT (check all that apply)

Check Credit card Money Order None Other (please identify):

Deposit Account Deposit Account Number: 50-0221 Deposit Account Name: INTEL CORPORATION

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

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FEES CALCULATION

1. EXTRA CLAIM FEES

Total Claims	22	23 ⁺	0	X	50.00	=	\$0.00
Independent Claims	7	5 ⁺	0	X	200.00	*	\$0.00
Multiple Dependent						=	

Large Entity	Small Entity	Fee	Fee	Fee Description
		Fee	Fee	
Code	Code	(S)	(S)	
1202 50	2202 25			Claims in excess of 20
1201 200	2201 100			Independent claims in excess of 3
1203 360	2203 180			Multiple Dependent claim, if not paid
1204 700	2204 395			**Reserve Independent claims over original patent
1205 300	2205 150			**Reserve claims in excess of 20 and over original patent
SUBTOTAL (1)			(S)	0.00

**By number previously paid. If greater, For Retention, see below.*

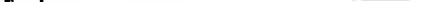
2. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description
Fee Code	Fee (\$)	Fee Code	Fee (\$)	
1031	130	2051	85	Surcharge - late filing fee or oath
1032	50	2052	25	Surcharge - late provisional filing fee or cover sheet
2033	130	2053	130	Non-English specification
1251	120	2251	90	Extension for reply within first month
1252	480	2252	225	Extension for reply within second month
1253	1,020	2253	510	Extension for reply within third month
1254	1,560	2254	765	Extension for reply within fourth month
1255	2,100	2255	1,080	Extension for reply within fifth month
1401	500	2401	250	Notice of Appeal
1402	200	2402	250	Filing a brief in support of an appeal
1403	1,000	2403	800	Request for oral hearing
1451	1,510	2461	1,510	Petition to institute a public use proceeding
1400	130	2480	130	Petitions to the Commissioner
1607	50	1807	50	Processing fee under 37 CFR 1.17(a)
1828	180	1808	180	Submission of Information Disclosure Stmt
1809	730	1809	395	Filing a submission after final rejection (37 CFR § 1.129(a))
1810	730	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))
Other fee authority				

Fee Paid
500.00

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SUBMITTED BY

Name (First/Last)	Libby M Hope	Registration No. (Analog/Serial)	46,774	Telephone	(949) 498-0601
Signature				Date	02/01/06

Based on PTO/SB/17 (12-04) as modified by Galaxy, Schott, Taylor & Ziffman (w/t) 12/15/2004.
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Docket No.: 42P11149

FEB 01 2006

Utility Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Patent Application of:

)

Graunke et al.

)

Serial No.: 09/896,537

)

Examiner: Lanier, Benjamin

Assignee: Intel Corporation

)

Filed: June 30, 2001

)

Art Unit: 2132

For: MULTI-LEVEL, MULTI-DIMENSIONAL
CONTENT PROTECTION

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APPEAL BRIEF UNDER 37 CFR §1.192
IN SUPPORT OF APPELLANTS' APPEAL
TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

Sir:

Appellants hereby submit this Appeal Brief in support of Appellants'
 Appeal from final rejection of the pending claims in the above-captioned case.

A Notice of Appeal was filed on December 1, 2005.

The fees set forth in 37 CFR §1.17(c) accompany this Appeal Brief.

An oral hearing is NOT desired.

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Appellants respectfully request consideration of this Appeal by the

Docket No.: 42P11149

Application No.: 09/896,537

1

PAGE 5/30 * RCVD AT 2/1/2006 7:28:39 PM [Eastern Standard Time] * SVR:USPTO-EXRF-6/25 * DNIS:2738300 * CSID:9494980601 * DURATION (mm:ss):07:12

honorable Board of Patent Appeals and Interferences, and allowance of the claims of the subject application.

Please charge any fees and/or credit any overcharges to Deposit Account No. 50-0221.

I. REAL PARTY IN INTEREST

The subject application is assigned to Intel Corporation of 2200 Mission College Boulevard, Santa Clara, California 95052-8119.

II. RELATED APPEALS AND INTERFERENCES

To the best of Appellants' knowledge, there are no appeals or interferences related to the present appeal that will directly affect, be directly affected by, or have a bearing on the Board's decision in the current matter.

III. STATUS OF THE CLAIMS

Claims 1-28 are were rejected in the Final Office Action mailed October 7, 2005 (hereinafter "Final OA"). Claims 1-3, 11-16, and 20-22 are currently being appealed. A copy of the claims on appeal is attached hereto as Claims Appendix.

IV. STATUS OF AMENDMENTS

An amendment to claims 12-13 and 18-19 was filed concurrently on February 1, 2006. The status of these amendments is currently pending. The Claims Appendix lists the claims as they currently stand, unamended.

Docket No.: 42P11149

Application No.: 09/896,537

PAGE 6/30 * RCVD AT 2/1/2006 7:28:39 PM [Eastern Standard Time] * SVR:USPTO-EXRF-6/25 * DNIS:2738300 * CSID:9494980601 * DURATION (mm:ss):07:12

V. SUMMARY OF CLAIMED SUBJECT MATTER

In one aspect of the invention, a method is provided for multi-level and multi-dimensional encoding of content for distribution to multiple environments. Content having one or more attributes is encrypted once and distributed to multiple environments having various levels of security. (Page 5, Paragraph 14)

Multi-dimensional encoding refers to encoding content that may have one or more attributes, such as resolution or frame-rate. Multi-level encoding refers to hierarchical encoding of content for a given attribute, where each successive level improves the attribute of the previous level, to achieve environment-independent encoding of content for one or more environments, where each environment has its own level of security. Both multi-dimensional encoding and multi-level encoding are characterized by the encoding of content once for distribution to multiple environments. (Page 5, Paragraph 15)

Multi-dimensional content is divided into sections. Each section is a portion of the content to be distributed, and represents a level of access for the attributes of the content, and each successive section is an improvement of the given attribute over the previous section. Each section is separately encrypted using separate keys from a hierarchy of keys. The keys of the hierarchy may be related by a cryptographic-strength one-way function, such that in decryption, the one-way function may be applied to any higher level section key to derive the key of the preceding, next lower level section. (Page 5, Paragraph 16)

For a given environment, the content is conveyed such that the highest

appropriate key for the attributes and assurance of the given environment are available. The lower level keys are derived using the one-way function, so that a device for accessing the content has access to all levels less than or equal to the given key, but not greater than the given key. (Page 5, Paragraph 17)

The present invention includes various operations, which will be described below. The operations of the present invention may be performed by hardware components or may be embodied in machine-executable instructions, which may be used to cause a general-purpose or special-purpose processor or logic circuits programmed with the instructions to perform the operations. Alternatively, the operations may be performed by a combination of hardware and software. (Page 5-6, Paragraph 18)

* The present invention may be provided as a computer program product which may include a machine-readable medium having stored thereon instructions which may be used to program a computer (or other electronic devices) to perform a process according to the present invention. The machine-readable medium may include, but is not limited to, floppy diskettes, optical disks, CD-ROMs (Compact Disc-Read Only Memories), and magneto-optical disks, ROMs (Read Only Memories), RAMs (Random Access Memories), EPROMs (Erasable Programmable Read Only Memories), EEPROMs (Electromagnetic Erasable Programmable Read Only Memories), magnetic or optical cards, flash memory, DVDs (Digital Video Discs), or other type of media / machine-readable medium suitable for storing electronic instructions. (Page 6, Paragraph 19)

Moreover, the present invention may also be downloaded as a computer program product, wherein the program may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals embodied in a carrier wave or other propagation medium via a communication link (e.g., a modem or network connection). Accordingly, herein, a carrier wave shall be regarded as comprising a machine-readable medium.

(Page 6, Paragraph 20)

As illustrated in FIG. 1, content 100 having a set of attributes is transformed into encrypted content 102 comprising a plurality of sections (only five sections shown) 104, 106, 108, 110, 112, where each section corresponds to one of L through N levels of access (L<N), L being the lowest level of access (e.g., lowest resolution), and N being the highest level of access (e.g., highest resolution). Each section is content encrypted at a level of access that a client may subscribe to. Encryption is achieved by using a plurality of hierarchically related keys 114, 116, 118, 120, 122, resulting in a plurality of dimensions 124 for a corresponding number of attributes. In preferred embodiments, the keys are related by a cryptographic-strength one-way function. (Page 6-7, Paragraph 21)

A method in accordance with FIG. 1 is illustrated in FIG. 4. It starts at block 400, and continues to block 402 where the hierarchical keys are generated. At block 404, encrypted content is created by applying each key to the content to create sections of the content. The method ends at block 406. (Page 7, Paragraph 22)

As illustrated in FIG. 2, a server 200 and a client 202 create a secure authenticated channel 204 that connects a digital rights management agent 208 (hereinafter "agent") on the client with a content clearinghouse 206 (hereinafter "clearinghouse") comprising content 100 on the server 200. A request to access content 100 is received from the client 202. When the server 200 receives appropriate payment from the client 202 for an M ($L \leq M \leq N$) level of access, the encrypted content 102 is communicated to the client 202, along with the appropriate key for the level of access subscribed to. (Page 7, Paragraph 23)

As illustrated in FIG. 3, using a base key 300 (i.e., a key commensurate with the client's 202 subscription, or rights, which is K_3 in this example), the agent 208 can create all appropriate lower level keys 302, 304. Once all appropriate keys 300, 302, 304 are obtained or created, the encrypted content 102 is decrypted into accessible content 306, where the client 202 has access to the corresponding sections 308, 310, 312 (obtained by using the appropriate key 300, 302, 304) of the content 100 having the given set of attributes less than or equal to the base key 300. (Page 7, Paragraph 24)

A method in accordance with FIG. 3 is illustrated in FIG. 5, beginning at block 500. At block 502, content having N levels of access is received. At block 504, a base key corresponding to an M of N level of access is received, and at block 506, the base key is used to derive lower level keys for accessing content corresponding to those lower level keys. The method ends at block 508. (Page 7-8, Paragraph 25)

For example, consider the case where the content's given attribute is "resolution" comprising levels of access 1-5 (i.e., L through N), where 1 is the lowest resolution and 5 is the highest resolution. If a client subscribes to a mid-point resolution, say 3 (i.e., M), then upon appropriate payment, the server transmits the content along with a base key corresponding to a resolution of 3. The client then uses the base key to generate all lower level keys. Once all appropriate keys are available, corresponding sections of the content may be accessed. (Page 8, Paragraph 26)

For synchronized, multi-media applications, synchronization information is encrypted separately from the information in each synchronized channel (for example, video and audio). That is, each aspect of the multi-media content may be separately encrypted, enabling the value of each aspect to be recognized in rights management transactions. Where various aspects interact, a multi-dimensional encryption scheme can be used wherever multi-dimensional hierarchical encoding is possible. For non-interactive aspects, each may be separately protected, or, optionally, they may be artificially related for purposes of key distribution. (Page 8, Paragraph 27)

In one exemplary embodiment, a matrix for each dimension is published, such that a key with a lower subscript in each dimension can be computed from the higher value key. In another exemplary embodiment, a modular exponentiation function is utilized. In yet another embodiment, a secret sharing scheme is utilized. (Page 8, Paragraph 28)

In one embodiment, a random key, $K_{i,j}$, is generated for each point on a D-dimensional grid, where D represents the number of attributes for given content. On the server side, content is encrypted into sections, or points on the grid, where each point is encrypted using its corresponding random key, $K_{i,j}$. For a dimension, X, a given matrix value in the matrix is represented by: (Page 9, Paragraph 29)

$$X_{i,j} = K_{i,j} \wedge H(K_{i+1,j}). \quad (\text{Page 9, Paragraph 30})$$

When content is transferred to the client, a base key commensurate with the client's subscription level is transmitted, along with one or more matrices, depending upon the number of attributes there are. Using the base key, a key with a lower subscript in each dimension may be computed from a higher value key. In exemplary embodiments, an exclusive-or operation may be used to derive the lower level key. For dimension X, this may be represented as follows: (Page 9, Paragraph 31)

$$K_{i,j} = F_1(K,i,j) = X_{i,j} \wedge H(K_{i+1,j}) \quad (\text{Page 9, Paragraph 32})$$

where $K_{i,j}$ represents the randomly generated key, which is derived from a higher-level key; $F_1(K,i,j)$ is the function computed by the exclusive-or of the X matrix value with the one-way function of the next highest level key $K_{i+1,j}$ in the first dimension; $X_{i,j}$ is the value at grid point (i, j) from the published matrix; and $H(K_{i+1,j})$ is a one-way function of the higher level key $K_{i+1,j}$, such as the well-known message digest function SHA-1 or MD5, for example. (Page 9, Paragraph 33)

Similarly, for dimension Y: (Page 9, Paragraph 34)

$K_{i,j} = F_2(K_{i,j}) = Y_{i,j} \wedge H(K_{i,j+1})$. (Page 9, Paragraph 35)

where $K_{i,j}$ represents the randomly generated key, which is derived from a higher-level key; $F_2(K_{i,j})$ is the function computed by the exclusive-or of the X matrix value with the one-way function of the next highest level key $K_{i,j+1}$ in the second dimension; $Y_{i,j}$ is the value at grid point (i, j) from the published matrix; and $H(K_{i,j+1})$ is a one-way function of the higher level key $K_{i,j+1}$, such as the well-known message digest function SHA-1 or MD5, for example. (Page 9-10, Paragraph 36)

The method can be extended to any number of dimensions. In the case of only one dimension, X can be omitted, such that: (Page 10, Paragraph 37)

$K_i = H(K_{i+1})$ (Page 10, Paragraph 38)

An example of corresponding matrices for dimensions X and Y is illustrated in FIGS. 6 and 7, where dimension X represents the attribute "frames per second", and dimension Y represents the attribute "resolution". In this example, the highest resolution and frames/second exist at grid point (3, 3). Thus, if a client subscribes to receiving the highest level of access, the environment will receive a base key corresponding to that level. (Page 10, Paragraph 39)

As illustrated at grid point (3, 3), it costs \$5000 to subscribe to content having the highest level resolution and the highest level of frames per second.

The client for an environment subscribing to these levels receives the base key, $K_{3,3}$, (all keys are the same for all dimensions). The base key, $K_{3,3}$, may then be used to generate all lower level keys. The keys may then be used to decrypt corresponding sections of the content. In progressive, hierarchical encoding, a lower level section of the content is decoded first, and each subsequent key is used to refine the previously decoded section of the content to produce a higher level attribute. (Page 10, Paragraph 40)

Using the equation for the appropriate dimension as shown above, the agent may create keys to access lower level content by computing the lower level keys based on the base key that is transmitted to the environment. (Page 10, Paragraph 41)

Keys may be generated from dimension X (FIG. 6) as follows: (Page 10, Paragraph 42)

$$K_{1,1} = F_1(K, 1, 1) = X_{1,1} \wedge H(K_{2,1}) \quad (\text{Page 11, Paragraph 43})$$

$$K_{1,2} = F_1(K, 1, 2) = X_{1,2} \wedge H(K_{2,2}) \quad (\text{Page 11, Paragraph 44})$$

$$K_{2,1} = F_1(K, 2, 1) = X_{2,1} \wedge H(K_{3,1}) \quad (\text{Page 11, Paragraph 45})$$

$$K_{2,2} = F_1(K, 2, 2) = X_{2,2} \wedge H(K_{3,2}) \quad (\text{Page 11, Paragraph 46})$$

$$K_{1,3} = F_1(K, 1, 3) = X_{1,3} \wedge H(K_{2,3}) \quad (\text{Page 11, Paragraph 47})$$

$$K_{2,3} = F_1(K, 2, 3) = X_{2,3} \wedge H(K_{3,3}) \quad (\text{Page 11, Paragraph 48})$$

Similarly, keys may be generated from dimension Y (FIG. 7) as follows:

(Page 11, Paragraph 49)

$$K_{1,1} = F_2(K, 1, 1) = Y_{1,1} \wedge H(K_{1,2}) \text{ (Page 11, Paragraph 50)}$$

$$K_{1,2} = F_2(K, 1, 2) = Y_{1,2} \wedge H(K_{1,3}) \text{ (Page 11, Paragraph 51)}$$

$$K_{2,1} = F_2(K, 2, 1) = Y_{2,1} \wedge H(K_{2,2}) \text{ (Page 11, Paragraph 52)}$$

$$K_{2,2} = F_2(K, 2, 2) = Y_{2,2} \wedge H(K_{2,3}) \text{ (Page 11, Paragraph 53)}$$

$$K_{3,1} = F_2(K, 3, 1) = Y_{3,1} \wedge H(K_{3,2}) \text{ (Page 11, Paragraph 54)}$$

$$K_{3,2} = F_2(K, 3, 2) = Y_{3,2} \wedge H(K_{3,3}) \text{ (Page 11, Paragraph 55)}$$

Note that for matrix X, the rightmost entries (i.e., (3, 1) and (3, 2)) are omitted, since they are used for deriving lower-level keys to the left, and for matrix Y, the topmost entries (i.e. (1, 3) and (2, 3)) are omitted, since they are used for deriving lower-level keys below. Since the keys are the same for all dimensions, entries missing from one matrix may be obtained from another matrix. Thus, equation $K_{2,2} = F_1(K, 2, 2) = X_{2,2} \wedge H(K_{3,2})$ from matrix X, $K_{3,2}$ may be obtained from $K_{3,2} = F_2(K, 3, 2) = Y_{3,2} \wedge H(K_{3,3})$ in matrix Y. (Page 11, Paragraph 56)

Using the base key and both matrices, all keys may be computed by moving to the left or moving down using an equation from a given matrix. For instance, since $K_{3,3}$ is given, $K_{3,2}$ may be computed using $K_{3,2} = F_2(K, 3, 2) = Y_{3,2} \wedge H(K_{3,3})$, and $K_{3,1}$ may be computed by using $K_{3,1} = F_2(K, 3, 1) = Y_{3,1} \wedge H(K_{3,2})$ (using "moving down" equations from matrix Y). Similarly, $K_{2,3}$ may be computed by using $K_{2,3} = F_1(K, 2, 3) = X_{2,3} \wedge H(K_{3,3})$, and $K_{1,3}$ may be computed by using $K_{1,3}$

= $F_1(K, 1, 3) = X_{1,3} \wedge H(K_{2,3})$ (using "moving left" equations from matrix X). (Page 11-12, Paragraph 57)

$K_{2,2}$ may be computed from $K_{2,2} = F_1(K, 2, 2) = X_{2,2} \wedge H(K_{3,2})$ or from $K_{2,2} = F_2(K, 2, 2) = Y_{2,2} \wedge H(K_{2,3})$. $K_{1,2}$ may be computed from $K_{1,2} = F_1(K, 1, 2) = X_{1,2} \wedge H(K_{2,2})$, or from $K_{1,2} = F_2(K, 1, 2) = Y_{1,2} \wedge H(K_{1,3})$. $K_{2,1}$ may be computed from $K_{2,1} = F_1(K, 2, 1) = X_{2,1} \wedge H(K_{3,1})$ or from $K_{2,1} = F_2(K, 2, 1) = Y_{2,1} \wedge H(K_{2,2})$. $K_{1,1}$ may be computed from $K_{1,1} = F_1(K, 1, 1) = X_{1,1} \wedge H(K_{2,1})$ or from $K_{1,1} = F_2(K, 1, 1) = Y_{1,1} \wedge H(K_{1,2})$. (Page 12, Paragraph 58)

With this method, any path (i.e., moving left or moving down) to compute a lower value key from a higher value key produces the same result. The length of the key provided by this method is limited by the message digest that is used. For example, it would be 128 bits for MD5 and 160 bits for SHA-1. (Page 12, Paragraph 59)

In another embodiment, a public modulus, m , comprising two secret large prime factors, p and q , is selected. For each dimension, d , an exponent, e_d , relatively prime to (having no common factors with) $(p-1)*(q-1)$ is chosen. The exponents are also pair-wise relatively prime. Since the size of the group of numbers generated is relatively large, it ensures that some approaches to inverting the modular exponentiation do not work. (Page 12, Paragraph 60)

These exponents may be small, but should be greater than 3. For the maximum value of all dimensions, i, j, \dots , a secret key $K_{i,j,\dots}$ greater than 1 and less than m is chosen. (Page 12, Paragraph 61)

$K_{i,j,\dots}$ may then be used to encrypt the content. To form the adjacent key in dimension d when decrypting, $K_{\dots,i,\dots}$, from key $K_{\dots,i+1,\dots}$, raise it to the e_d power mod m. An equation for this is as follows: (Page 12-13, Paragraph 62)

$$K_{\dots,i,\dots} = F_d(K_{\dots,i+1,\dots}) = K_{\dots,i+1,\dots}^{e_d} \bmod m. \quad (\text{Page 13, Paragraph 63})$$

Assuming m is sufficiently large to disable factoring (at least 1024 bits for most applications), it would be infeasible to reverse the computation and determine higher keys in any dimension. (Page 13, Paragraph 64)

As with the first exemplary embodiment, any path to compute a lower value key from a higher value key produces the same result. This method provides up to 1024 bits for a key. (Page 13, Paragraph 65)

Consequently, the key size, size of required information, and computation requirements may help to determine which of these two methods is optimal for a given implementation. (Page 13, Paragraph 66)

In yet another embodiment, a publicly known cryptographic one-way function H, and a d-dimensional secret sharing scheme S are utilized. For dimension d, key $X_{d,i} = H(X_{d,i+1})$. Additional artificial dimensions, such as cost, may be added to provide additional constraints. Key $K_{i,j,\dots} = S_n(X_{1,i}, X_{2,j}, \dots)$ where S is an n-of-n secret sharing scheme. (Page 13, Paragraph 67)

* For example, in FIG. 8, the client may purchase a high-resolution movie encrypted with a 2 dimensional scheme, where an artificial third dimension of cost is also added. The server would communicate shares $X_{1,3}$ and $X_{2,3}$ to the

client. The client would compute lesser value shares in each dimension using the hash function H as follows: (Page 13, Paragraph 68)

$X_{1,2} = H(X_{1,3})$, $X_{1,1} = H(X_{1,2})$ (Page 13, Paragraph 69)

$X_{2,2} = H(X_{2,3})$, $X_{2,1} = H(X_{2,2})$, and (Page 13, Paragraph 70)

$X_{3,5} = H(X_{3,6})$, $X_{3,4} = H(X_{3,5})$, $X_{3,3} = H(X_{3,4})$, $X_{3,3} = H(X_{3,4})$, $X_{3,2} = H(X_{3,3})$, $X_{3,1} = H(X_{3,2})$. (Page 13-14, Paragraph 71)

The client may then compute all the particular shares, $K_{i,j}$, used to decrypt the various portions of hierarchically encrypted and encoded content using a 3-of-3 secret sharing scheme S: (Page 14, Paragraph 72)

$K_{1,3} = S_3(X_{1,1}, X_{2,3}, X_{3,3})$, $K_{2,3} = S_3(X_{1,2}, X_{2,3}, X_{3,5})$, $K_{3,3} = S_3(X_{1,3}, X_{2,3}, X_{3,6})$;
(Page 14, Paragraph 73)

$K_{1,2} = S_3(X_{1,1}, X_{2,2}, X_{3,2})$, $K_{2,2} = S_3(X_{1,2}, X_{2,2}, X_{3,4})$, $K_{3,2} = S_3(X_{1,3}, X_{2,2}, X_{3,5})$;
(Page 14, Paragraph 74)

$K_{1,1} = S_3(X_{1,1}, X_{2,1}, X_{3,1})$, $K_{2,1} = S_3(X_{1,2}, X_{2,1}, X_{3,2})$, $K_{3,1} = S_3(X_{1,3}, X_{2,1}, X_{3,3})$;
(Page 14, Paragraph 75)

giving it access to all encrypted portions of the content. (Page 14, Paragraph 76)

The additional artificial cost dimension prevents one from purchasing both $K_{1,3}$ and $K_{3,1}$, obtaining both $X_{2,3}$ and $X_{1,3}$ and being able to construct $K_{3,3}$ or $K_{2,2}$. In this case, the artificial dimension reflects the additional value of the integration

of the dimensions. (Page 14, Paragraph 77)

Once all appropriate keys have been generated, content may be accessed by applying a key to its corresponding section. In an exemplary embodiment, lower level sections of the content are decoded first, and each successive section is decoded to refine the previously decoded section. (Page 14, Paragraph 78)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 2, 11-12, 14, 15, 20, and 21 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,485,577 ("Eyer").

Claims 3, 13, 16, and 22 stand rejected under 35 U.S.C. §103(a) as being obvious over Eyer and U.S. Patent No. 5,448,639 ("Arazi").

VII. ARGUMENT

REJECTION UNDER 35 U.S.C. §102(b) OVER U.S. PATENT NO. 5,485,577

(HEREINAFTER "EYER")

Claims 1, 2, 11-12, 14, 15, 20, and 21

As the Honorable Board is well aware, a "claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicants respectfully submit that claims 1, 2, 11-12, 14, 15, 20, and 21 are patentably distinguishable over Eyer. At the least, Eyer does not disclose

Docket No.: 42P11149

Application No.: 09/896,537

15

"content comprising a set of attributes having L through N levels of access", as required by, for example, claim 1. Each of the other remaining pending independent claims recite limitations that are similar to these limitations of claim 1, although some differences may exist among the limitations of the other pending independent claims. These similar limitations nevertheless patentably distinguish the claims over Eyer.

Eyer discloses a method for incrementally delivering authenticated access rights to an access control processor. In Eyer, data defining the access rights is divided into a plurality of subgroups which are transmitted to the processor as authenticated data in a plurality of messages. Upon receipt of a message by the processor, a current cryptographic key is derived using the authenticated data of the current message. The current cryptographic key is compared to a cryptographic key from a prior message. If the keys match, then the validity designation for that key is set to a valid state for each storage bank that is storing data authenticated by the current message. If the keys do not match, the validity designation for that key is set to a valid state for each storage bank that is storing data authenticated by the current message, and the validity designation for that key is set to an invalid state for all other storage banks. (Eyer, column 2, lines 19-41.)

In embodiments of the claimed invention, content may comprise a set of attributes. For example, an attribute may comprise "resolution". Furthermore, the attributes may have L through N levels of access. For resolution, for example, 1 may be the lowest resolution that may be accessed (e.g., subscribed

to), and 5 may be the highest resolution that may be accessed (e.g., subscribed to). See further, for example, Specification at paragraphs 21, 23, and 26.

In response, the Examiner asserts that "Eyer discloses that the television signals have subscription and premium services (Col. 1, lines 14-30), which would correspond to the different levels of access. For example the base level of access would be your run of the mill basic cable, and the maximum level of access, which correspond to N of the claims, would be access to all channels that the television provider has available. Element M of the claims would correspond to some point in between, which could be basic cable plus HBO for example. These levels of access are represented in the access rights that the terminals receive and furthermore in the decryption keys that are later generated from those access rights. Therefore Eyer discloses the "levels of access" as claimed." (Final OA, page 2, Item 1).

Applicants respectfully disagree. The claims of the subject application clearly require receiving "content comprising a set of attributes having L through N levels of access" (emphasis added). While Eyer discloses data that may be divided into a plurality of subgroups, Eyer does not disclose that such data has attributes which have levels of access as required by the claimed invention.

Thus, since Eyer does not teach or disclose each and every element of the claimed invention, it is respectfully submitted that the Examiner has failed to establish *prima facie* that claims 1, 2, 11-12, 14, 15, 20, and 21 are anticipated by Eyer. Thus, it is respectfully submitted that the Examiner's rejection of these claims under 35 U.S.C. §102(b) as being anticipated by Eyer is erroneous, and

Docket No.: 42P11149

Application No.: 09/898,527

17

PAGE 21/30 * RCVD AT 2/1/2006 7:28:39 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-6/25 * DNI:2738300 * CSID:9494980601 * DURATION (mm:ss):07:12

respectfully requested that the Examiner's rejection of these claims be reversed.

REJECTION UNDER 35 U.S.C §103(a) OVER U.S. PATENT NO. 5,485,577

• ("EYER") AND U.S. PATENT NO. 5,448,639 ("Arazi")

Claims 3, 13, 16, and 22

As the Honorable Board is well aware, in order to establish a *prima facie* case of obviousness:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." (Emphasis added). *In re Vaech*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Manual of Patent Examining Procedure (MPEP), 8th Edition, August 2001, §2143.

Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness because:

1. There is no suggestion or motivation in Eyer or in Arazi for combination.
2. The combination of Eyer and Arazi does not teach or suggest all the claim limitations.

There is no suggestion or motivation in Eyer or in Arazi for combination

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). MPEP §2143.01. Furthermore, though a combined element may be a "technologically simple concept", the reference must still provide the motivation for the combination. (*In re Kotzah*, 217 F.3d at 1371, 55 USPQ2d at 1318.) MPEP §2143.01.

Arazi discloses a digital signature device that comprises hardware or software means for carrying out modular exponentiation and/or modular multiplication operations. (Arazi, column 1, lines 47-50.)

While Eyer is directed to incremental delivery of access rights to data, Arazi is directed to a digital signature device. The fact that Eyer may use digital signatures, however, does not make it a candidate for combination with Arazi absent a suggestion for desirability of the combination. Applicants submit that such suggestion is absent because the references address different needs. Eyer addresses a need for a secure method for transmission of data, while Arazi addresses a need for a simplified and less expensive digital signature device. Applicants respectfully submit that the combination of Eyer with Arazi is not suggested in either reference.

In response to this, the Examiner indicates that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to

generate the cryptographic keys of Eyer using the modular exponentiation methods of Arazi in order to reduce overhead as disclosed in Arazi" (Final OA, page 2-3).

However, as the Manual of Patent Examining Procedure (MPEP), §2142 indicates, the "initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. 'To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teaching of the references.' *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Intef. 1985). Applicants respectfully submit that the Examiner has failed to meet this burden, and maintain that both Eyer and Arazi lack the suggestion or motivation for combination.

The combination of Eyer and Arazi does not teach or suggest all the claim limitations

As discussed above, Eyer does not disclose "content comprising a set of attributes having L through N levels of access", as required by, for example, claim 1. Furthermore, Arazi does not disclose, teach, or suggest that which Eyer is missing. Therefore, the combination of Eyer and Arazi does not teach or suggest all the claim limitations, and therefore does not produce the Applicants' invention as embodied in the claims.

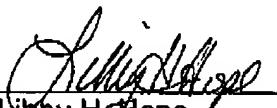
Since the Examiner has not established a prima facie case of obviousness, the combination of Eyer and Arazi is in error. Thus, it is respectfully requested that the Examiner's rejection of claims 3, 3, 16, and 22 under 35 U.S.C. §103(a) as obvious in view of Eyer and Arazi be withdrawn.

VIII. CONCLUSION

* For the reasons discussed above, Appellants respectfully submit that each and every one of the final rejections made by the Examiner in the Final Office Action is erroneous. Accordingly, Appellants respectfully request that the Honorable Board of Patent Appeals and Interferences reverse the Examiner and direct that all of the currently pending claims be allowed.

Respectfully submitted,

Date: February 1, 2006



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CLAIMS APPENDIX

1. (Original) A method comprising:

receiving content comprising a set of attributes having L through N levels of access, where L<N, and content at a given level of access being decryptable by a corresponding key;

receiving a base key corresponding to an M of N level of access, where L<=M<=N; and

deriving lower level keys based on the base key, the lower level keys being used to access content having an M level of access or lower.

2. (Original) The method of claim 1, additionally comprising receiving a D-dimensional matrix for each attribute in the set of attributes, wherein D corresponds to a number of attributes of the content, and wherein the matrix comprises matrix values for determining how to generate a key corresponding to a given section of the content, and said deriving lower level keys based on the base key comprises, for a given lower level key, using a function based on a matrix value corresponding to the lower level key and a one-way hash function of an adjacent higher level key.

3. (Original) The method of claim 1, wherein said deriving lower level keys based on the base key comprises, for a given lower level key, using a modular exponentiation of a higher level key.

11. (Original) A machine-readable medium having stored thereon data

representing sequences of instructions, the sequences of instructions which, when executed by a processor, cause the processor to perform the following:

receive content comprising a set of attributes having L through N levels of

access, where L<N, and content at a given level of access being

decryptable by a corresponding key;

receive a base key corresponding to an M of N level of access, where

L<=M<=N; and

derive lower level keys based on the base key, the lower level keys being

used to access content having an M level of access of lower.

12. (Original) The method of claim 11, additionally comprising instructions that cause the processor to receive a D-dimensional matrix for each attribute in the set of attributes, wherein D corresponds to a number of attributes of the content, and wherein the matrix comprises matrix values for determining how to generate a key corresponding to a given section of the content, and the instructions cause the processor to derive lower level keys based on the base key comprises, for a given lower level key, using a function based on a matrix value corresponding to the lower level key and a one-way function of an adjacent higher level key.
13. (Original) The method of claim 11, wherein the instructions cause the processor to derive lower level keys based on the base key comprises, for a given lower level key, by using a modular exponentiation of a higher

level key.

14. (Original) An apparatus comprising:

at least one processor; and

a machine-readable medium having instructions encoded thereon, which

when executed by the processor, are capable of directing the processor to:

receive content comprising a set of attributes having L through N

levels of access, where $L < N$, and content at a given level of access being decryptable by a corresponding key;

receive a base key corresponding to an M of N level of access,

where $L \leq M \leq N$; and

derive lower level keys based on the base key, the lower level keys

being used to access content having an M level of access of lower.

15. (Original) The method of claim 14, additionally comprising instructions that cause the processor to receive a D-dimensional matrix for each attribute in the set of attributes, wherein D corresponds to a number of attributes of the content, and wherein the matrix comprises matrix values for determining how to generate a key corresponding to a given section of the content, and the instructions cause the processor to derive lower level keys based on the base key comprises, for a given lower level key, using

a function based on a matrix value corresponding to the lower level key and a one-way hash function of an adjacent higher level key.

16. (Original) The method of claim 14, wherein the instructions cause the processor to derive lower level keys based on the base key comprises, for a given lower level key, by using a modular exponentiation of a higher level key.
20. (Original) A method comprising:
 - receiving encrypted content comprising a set of attributes having L through N levels of access, where $L < N$, and each level being accessible by a corresponding key;
 - receiving a base key corresponding to an M of N level of access, where $L \leq M \leq N$;
 - deriving lower level keys based on the base key, the lower level keys being used to access content having an M level of access or lower;
 - and
 - using a given lower level key to decrypt the content at a corresponding level.
21. (Original) The method of claim 20, additionally comprising receiving a D-dimensional matrix for each attribute in the set of attributes, wherein D corresponds to a number of attributes of the content, and wherein the matrix comprises matrix values for determining how to generate a key

corresponding to a given section of the content, and said deriving lower level keys based on the base key comprises, for a given lower level key, using a function based on a matrix value corresponding to the lower level key and a one-way function of an adjacent higher level key.

22. (Original) The method of claim 20, wherein said deriving lower level keys based on the base key comprises, for a given lower level key, using a modular exponentiation of a higher level key.